

Calendar Anomalies in the Amman Stock Exchange

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[Abstract] Market efficiency states that stock prices are fairly priced and reflect all available information in the market. The arrival of new information will be instantly reflected in the new stock prices and no investor will be able to achieve abnormal return more than the market offers. However, researchers have shown that in certain dates stock prices go up compared to the rest of the period. The dates are called anomalies or calendar effects. These anomalies have been shown to exist in both mature and emerging stock markets. This paper examines the existence of three types of calendar effects; the month-of-the-year, the turn-of-year, and the turn-of-the fiscal year in the Amman Stock Exchange (ASE) for the period 1978-2018. This researcher concludes that except for the sub-period 1993-2018 where the turn-of-the-financial year is present, none of the calendar anomalies are present in the Amman Stock Exchange.

[Keywords] efficient market hypothesis, emerging markets, Amman Stock Exchange, calendar effects

Introduction

Efficient market hypothesis indicates that stock prices reflect all available information. The arrival of new information is instantly incorporated in stock prices, and, as a result, investors cannot earn more than the stock market offers. However, the existence of abnormal returns during certain calendar dates has been documented in both mature and emerging stock markets. For example, it has been reported that stock prices decline in late December and increase in early January. The phenomenon has been referred to as the January effect. The January effect has been explained by tax effects when stock holders sell their losing stocks in late December to write off taxes and then buy them in January. The sale of stocks in late December brings stock prices down, and the purchase of stocks in early January pushes prices up. There have been other calendar events in which stock returns have fluctuated around these dates. The high returns on certain calendar dates have been referred to in finance literature as market anomalies. Market anomalies include the day-of-the-week, weekend, day-of-the-month, turn-of-the-month, month-of-the-year, turn-of-the-year, and holiday effects.

This paper explores the month-of-the-year, the turn-of-the-year, and the turn-of-the-financial year effects in the Amman Stock Exchange (ASE) for the period 1978 to 2018. Furthermore, this paper examines whether the structural break in the data has any effect on the calendar effects. This paper is organized as follows: it starts with an introduction, which is followed by a discussion of the performance of the ASE, a literature review, data presentation, suggested hypotheses, a methodology, and a conclusion.

Performance of the Amman Stock Exchange

Since its inception in 1978, the Amman Stock Exchange (ASE) has experienced tremendous growth in many aspects of stock market indicators. The value of stocks traded in the secondary market rose from JD5.6 at the end of 1978 to JD20.3 billion in 2008 and then decreased to JD2.3 billion in 2018. The market capitalization of listed shares increased from JD286 million at the end of 1978 to JD29.2 billion in 2007 and then decreased to JD16.1 billion at the end of 2018. The number of listed companies went up from 66 firms in 1978 to 224 firms in 2018.

The performance of the Amman Stock Exchange, as measured by the stock price index, has witnessed significant volatility due to the economic and political situation in the region. As Table 1 in Appendix 1 shows, the stock price index at the ASE increased from 1978 until 1983 when it fell by 24.6%. This negative trend in the general price index continued until 1986 when it started to increase again in 1987. The reasons for this drop in the price index were a high unemployment rate caused by recession and the uncertainty surrounding the Iraq-Iran war.

Since 1987, the price index of the ASE has witnessed a steady increase with the exception of 1990, when the general price index dropped by 13.83%. The main reason for this drop was the second Gulf war. Exports, tourism, and industrial production have suffered major set-backs since August 1990. Exports, in particular, suffered because both Iraq and Kuwait were among the largest importers of Jordanian products. Remittances from expatriates living in the Gulf States were brought to their lowest level.

Furthermore, the forced return of tens of thousands of workers put excessive pressure on infrastructure. Prices of real estates and housing rent went up excessively. This increase in real estate prices and rent diverted some of the capital out of the equity market to the real estate market, which led to the fall in the stock price index. After the Gulf war was over and stability in the region was regained, returned expatriates started to invest their life savings in the country. In addition, when the United Nations eased the sanctions against Iraq and approved the deal of oil for medicine and food, some Jordanian industries, which had started before the Gulf War but which had been brought to a halt during the crises, resumed their production.

These factors led to the increase in price index during the period 1991 to 1993. The decrease in the price index in 1994 by 9.4% and in 1996 by 3.6% was due to the tight monetary policy followed by the Central Bank of Jordan, high investment in the primary market, and uncertainty about the peace process in the Middle East. In 1997, the stock price index increased by 10.3% and increased in 1998 by only 0.5%; the index fell in the following two years.

The pessimistic view about the economy was the main reason. The impressive economic growth had been reflected in the performance of the stock market since 2003, and the stock price index had shown a steady growth during that period. However, because of the military tension in the region in 2006, the price index dropped by 32.6% in 2006. In 2007 the stock market gained some momentum and, then, from 2008 to 2018, it plunged again due to political instability, the world-wide economic crises, and the Arab Spring. The devastating wars in Iraq and Syria have had their toll on the Jordanian economy. Both countries had been either a major importer of Jordanian products or a trade route to other countries. Trade with or through these countries had been brought to a halt.

Literature Review

Calendar anomalies have been studied widely across countries. Researchers have studied this phenomenon in the stock markets in both developed and emerging stock markets. The results of this research have been either supportive or non-supportive of market seasonality. Hansen and Lunde (2003) studied the Monday and January effect for Denmark, France, Germany, Hong Kong, Italy, Japan, Norway, Sweden, the UK, and the USA. They found the calendar effects were significant in most series, and the end of the year effects exhibited the largest anomalies. Alagidede and Panagiotidis (2006) found the month-of-the-year effect in April and the day-of-the-week effect in the Ghana Stock Exchange. Wong, Agarwal, and Wang (2006) revealed that the January effect, the day-of-the-week effect, the turn-of-the-month effect and the pre-holiday effects were not present in the Singapore Stock Market. Choudhary (2008) did not find the day-of-the-week effect for the whole period of the study (1996-2006) and the sub-period 2002-2006 in the Indian Stock Market. However, the day-of-the-week was present for the sub-period 1996-2001. Ali and Akbar (2009) dismissed the existence of the week and monthly effects in the Pakistani Stock Market for the period 1991-2006.

Guidi, Gupta, and Maheshwari (2010) found that the day-of-the-week was present in the Polish Stock Market and the Slovenian Stock Market on Monday, Thursday, and Friday. The Thursday effect was present in the Czech equity market, and the Monday effect was found in the Hungarian, Slovakian, Slovenian, and Romanian stock markets. Lim and Chia (2010) examined the effect of the day-of-the-week and the twist-of-the-Monday effect for the ASEAN-5 stock markets; they found support for the day-of-the-week effect in Malaysia and Thailand stock markets. Furthermore, they found that Monday had lower returns compared to Thursday and Friday returns in the Malaysian stock market, while Friday had the highest returns of the week in the Thailand stock market. Chakrabarti and Sen (2011) found that the strong presence of the day-of-the-week effect during high volatility and on Monday and Tuesday are real anomalies in the Indian Rupee-US Dollar Market.

Georgantopoulos and Tsamis (2012) documented the existence of the turn of the month in Germany and France; the turn-of-the-month and the time-of-the-month effects were strongly present in Austria and Portugal; the day-of-the-week, the turn-of-the-month, the time-of-the-month and the January-effect existed in Greece. Qureshi and Hunjra (2015) explored the effect of the day-of-the-week and January effect on the Pakistani Stock Market for the period 1992-2013. They had shown the existence of the day-of-the-week effect for the period 1992-1997, but it was not present for the period 1998-2013. Furthermore, they found that the January effect did not exist in the Pakistani Stock Market. Gouider, Kaddour, and Hmaid (2015) tracked the existence of weak negative returns on Mondays and high returns during Wednesday through Friday in the Tunisian Stock Market. They showed the highest positive return was on Friday. Nasir and Khan (2016) studied the Ramadan effect on the Karachi Stock Exchange for the period 2001-2010. They found that the month of Ramadan had a minor positive effect on the Karachi Stock Exchange. Slamet, Laela, and Pangadi (2016) concluded that the return on Wednesday and Friday was higher than other days in the Indonesia Stock Market, and the return in the second week tended to be higher than the returns in other weeks.

Shahid and Sattar (2017) found evidence of the Monday, turn-of-the-month and holiday effects in the Pakistan Stock Market. Ali, Akhter, and Ashraf (2017) studied the effect of Muslim holydays on selected Asian stock markets. The markets included Pakistan, Bahrain, Saudi Arabia, and Turkey. They found that these markets had a positive return for Eid-ul-Fitr, while other days had no significant positive effects. Furthermore, they found that Friday had positive effects in all Asian stock markets under study. Caporale and Zakirova (2017) investigated the calendar anomalies in the Russian stock market and found that the January effect, the day-of-the-week, and the turn-of-the-month effects disappear when transaction costs are taken into account. Winkelried and Iberico (2018) found a significantly positive return on Mondays and a significant negative return on Fridays in six major Latin American stock markets.

Rossi and Gunardi (2018) studied calendar anomalies in the stock markets in France, Germany, Italy, and Spain. They found that January had a significant positive effect only in the Italian and Spanish stock markets. Furthermore, they concluded that there was no weekend effects in the European stock markets under study.

Data

This paper utilizes the weekly data of the stock price index published by the Amman Stock Exchange, the Central Bank of Jordan, and the weekly stock price index derived from the emerging database maintained by the International Financial Corporation (IFC). The data starts from December 31, 1978, and goes until December 31, 2018. The number of observations for the sub-period from December 31, 1978, to March 17, 1993, has 780 observations; the number of observations for the sub-period of March 18, 1993, to December 31, 2018, has 1,300 observations; and the number of observations for the whole period of December 31, 1978, to December 31, 2018, is 2,080 observations.

Hypothesis

The following two hypotheses will be examined:

$H_0: \alpha_2 = 0$, the anomalies (the turn-of-the-month, the turn-of-the-year and the turn-of-the- financial year) are not present in the Amman Stock Exchange.

$H_1: \alpha_2 \neq 0$ the anomalies do exist in the Amman Stock Market

Methodology

This paper uses the dummy variable regression model to test whether anomalies exist in the Amman Stock Exchange or not. This technique quantifies qualitative aspects, such as calendar events, as independent variables in the regression model. A dummy variable (also referred to as categorical or binary) is a variable that takes the value of 1 if the attribute (excess returns) exists or 0 if it does not. If a qualitative variable has n categories, only $n-1$ dummy variables can be used. Using dummy variables equal to the

number of categories will lead to what is called the dummy variable trap or perfect multi-collinearity among variables. The intercept in the dummy variable regression equation represents the coefficient of the category that is not assigned any dummy variable, and it is referred to as the base or the benchmark. Hence, if we are interested in studying which days of the week offers the highest returns, we assign four dummy variables for four days, and the intercept will represent the coefficient of the day that is not assigned a dummy variable. The same applies when looking at which month has the highest return.

Calendar effects can be studied by either using the returns of individual stocks or by using the stock price index. A common approach used in the literature when utilizing the stock price index is using the following formula:

$$R_t = \alpha_1 + \alpha_2 D + \varepsilon_t \quad (1)$$

Where R_t is the return on the stock market and derived by the following equation:

$$R_t = \ln P_t - \ln P_{t-1} \quad (2)$$

Where $\ln P_t$ is the natural log of the stock price index at time t , and P_{t-1} is the stock price index for period $t-1$.

D is a dummy variable used to measure the anomaly effect. It takes the value of 1 for anomalies, and it is 0 otherwise. ε_t is the error term and α_1 is the intercept where it measures the average return on a calendar period that is not assigned a dummy variable.

This paper examines the following three types of anomalies: the month-of-the-year effect (D_m) that examines whether the average return for the first 15 trading days will be higher than the average return for the rest of the month, the turn-of-the-year (D_y) that tests whether the average return of the first six trading days in January is higher than the average return for the rest of the month, and the turn-of-the-financial-year (D_{fy}) that compares the average return for the first six days in the month of July and the average return for the last six trading days in the month of June. The dummy variable in Equation 1 becomes (D_m) when the month-of-the-year is tested, becomes (D_y) if the turn-of-the-year is tested, and (D_{fy}) if the turn-of-the-financial year is examined.

Furthermore, previous research showed that there was a structural shift in the data in March 1993 due to the influx of investment in the stock market caused by the passing of laws that encouraged and facilitated investment (Haj, 2014). Therefore, the data is divided into two sub-periods. The first period starts extends from December 31, 1978, to March 17, 1993; the second period extends from March 18, 1993, to December 31, 2018. Table 2 shows the month-of-the-year-effect (D_m) for the whole period and the two sub-periods. It is clear that the coefficients for the dummy variables for the whole period and the two sub-periods are not statistically different from 0 for any level of significance. This implies that the average return of the first 15 days is not different from the rest of the period. Therefore, we do not reject the null hypothesis of nonexistence of month-of-the-year effect.

Table 2
The-Month-Of- The Year Effect for the ASE for the Whole Period and the Two Sub Periods

Panel 1 The month of the year effect (1978-1993) $R_t = \alpha_1 + \alpha_2 D_m + \varepsilon_t$			
α_1 Appendix A. T-stats	α_2 T-stats	# of obs.	F
0.00260864 (0.953457)	-0.0035156 (-0.66943)	780	0.5851
Panel 2 The month of the year effect (1993-2018) $R_t = \alpha_1 + \alpha_2 D_m + \varepsilon$			
α_1 Appendix B. T-stats	α_2 T-stats	# of obs.	F
0.002302499 (1.21029*)	-0.000319002 (-0.03795)	1,300	0.0030
Panel 3 The month of the year effect (1978-2018) $R_t = \alpha_1 + \alpha_2 D_m + \varepsilon$			
α_1 Appendix C. T-stats	α_2 T-stats	# of obs.	F
0.00397345 (1.63084)	-0.002476937 (-0.6931)	2,080	0.3182

*, **, *** significant at 1%, 5%, at 10% respectively

It has been documented that some stock markets display the turn-of-the-year effect and the turn-of-the-financial-year effect. Table 3, Panel 1, indicates that the coefficients of the dummy variables for the turn-of-the year and the turn-of-the financial year are not statistically different from 0 for the sub-period 1978-1993, confirming that the average return for the first 6 days in January is not different from the average return of the rest of the month, and the average return of the last six days in June are not different from the average returns of the first 6 days in July. Therefore, we do not reject the null hypothesis of no presence of the turn-of-the-year and the turn-of-financial year effects. Furthermore, Panel 2 of Table 3 shows the turn-of-year and the turn-of-the-financial-year effects for the sub-period 1993-2018. The coefficient of the turn-of-the year is not statically significant, and, therefore, we cannot reject the null hypotheses of non-existence of the turn-of-the year effect.

Table 3

Turn-of-the-Year and Turn-of-the-Financial-Year Effect in ASE (1988-2018) with Sub-Periods-Panel 1

Panel 1. Turn-of-the-year and Turn-of-the-financial-year effect in ASE (1978-1993)			
Turn-of-the-year effect $R_t = \alpha_1 + \alpha_2 D T y + \varepsilon_t$			
α_1 T-stats	α_2 T-stats	# of obs.	F
0.0005238379 (0.25718)	0.0066396278 (0.66233)	780	0.4387
Turn-of-the-year effect $R_t = \alpha_1 + \alpha_2 D f y + \varepsilon_t$			
α_1 T-stats	α_2 T-stats	# of obs.	F
0.001015776 (0.49974)	0.005935732 (-0.55942)	780	0.3130
Panel 2. Turn-of-the-year and Turn-of-the-financial-year effect in ASE (1993-2018)			
Turn-of-the-year effect $R_t = \alpha_1 + \alpha_2 D y + \varepsilon_t$			
α_1 T-stats	α_2 T-stats	# of obs.	F
0.002252616 (1.70718***)	-0.000353138 (-0.05113)	1,300	0.0026
Turn of the financial year effect $R_t = \alpha_1 + \alpha_2 D f y + \varepsilon_t$			
α_1 T-stats.	α_2 T-stats.	# of obs.	F
0.002683077 (2.03528**)	-0.010123139 (-1.60702***)	1,300	2.5825***
Panel 3. Turn-of-the-Year and Turn-of-the-financial-year effect in ASE (1978-2018)			
Turn-of-the-year effect $R_t = \alpha_1 + \alpha_2 D y + \varepsilon_t$			
α_1 T-stats	α_2 T-stats	# of obs.	F
0.00223509 (1.50815)	-0.00353169(-0.05113)	2,080	0.1826
Turn of the financial year effect $R_t = \alpha_1 + \alpha_2 D f y + \varepsilon_t$			
α_1 T-stats.	α_2 T-stats.	# of obs.	F
0.002683077 (2.03528***)	-0.010123139(-1.60702)	2,080	2.3825

*, **, ***, significant at 1%, 5%, and 10% respectively

Only the turn-of-the financial year has a significant coefficient at the 10% significance level for the sub-period 1993 to 2018. This implies that the average returns for the last 6 days of June are greater than the average returns of the first 6 days of July presence of the turn-of-the financial year effect. Finally, Panel 3 of Table 3 shows the results of the turn-of-the- year and the turn-of-the-financial year for the whole period (1978--2018). The coefficients for both effects are not significantly different from 0, indicating no presence of the turn-of-the year and the turn-of-financial year effects. Hence, the Amman financial market does not display the turn-of-the-year effect. The absence of anomalies in the market can be due to institutional features, such as thin trading and low volume (Johnson & Sonen, 1995). Furthermore, since the Amman Financial Market is segmented from other markets, the anomalies' effects in other markets cannot be transformed to it.

Conclusion

This paper has tested three types of anomalies in the Amman financial market using the dummy variables approach. These anomalies are the month-of-the-year, the turn-of-the year, and the turn-of-the financial year. In addition, this paper has examined whether the existence of a structural break will have any impact on the analysis. The empirical work shows that the month-of-the year is not present for the whole period of the study and the two sub-periods in the Amman Stock Exchange. Furthermore, the structural break has no effect on the existence of the month-of-the year effect. Moreover, this paper does not support the existence of the turn-of-year and the turn-of-financial year effects for the whole testing period or for the sub-period 1988--1993. Therefore, we reject the null hypothesis of the existence of anomalies in the market. This paper concludes that the turn-of-the-month, the turn-of-the-year, and the turn-of-the-financial year are not present in the Amman Stock Exchange for the whole period and for the two sub-periods. Only the turn-of-financial year is present for the sub-period 1993--2018. Furthermore, the structural break does not have any effect on the data and does not alter the conclusion.

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Appendix 1

Table 1

Market capitalization, value traded, and stock price index

Year	Market Capitalization	Value Traded	Stock Price Index	Percentage Change in Stock Index
1978	286.1	5.6	585.6	
1979	452.3	15.8	679.3	16.00%
1980	495.5	41.4	757.5	11.51%
1981	834.6	75.4	1,201.8	58.65%
1982	1,034.8	128.3	1,382.5	15.04%
1983	1,053.8	141.3	1,042.1	-24.62
1984	911.7	59.3	811.8	-22.10%
1985	926.9	66.7	786.0	-3.18%
1986	891.8	69.5	723.5	-7.95
1987	929.4	148.2	796.9	10.15%
1988	1,104.7	132.6	845.1	6.05%
1989	1,400.4	367.6	932.7	10.37%
1990	1,293.2	268.9	804.3	-13.77%
1991	1,707.1	302.8	1,000.0	24.33%
1992	2,995.6	887.0	1,299	29.9%
1993	3,463.9	968.6	1,585	22.02%
1994	3,409.3	495.1	1,436	-9.40%
1995	3,495.4	419.0	1,591.7	10.84%
1996	3,461.2	248.6	1,534.6	-3.59%
1997	3,862.0	355.2	1,692.4	10.28%
1998	4,156.6	464.4	1,701.3	0.53
1999	4,137.7	389.5	1,673.5	-1.63%
2000	3,509.6	287.8	1,330.5	-20.50%
2001	4,476.7	668.7	1,727.2	29.82%
2002	5,029.0	950.3	1,700.2	-1.56%
2003	7,772.8	1,855.2	2,614.5	53.78%
2004	13,033.8	3,793.2	4,245.6	62.39%
2005	26,667.1	16,871.0	8,191.5	92.94%
2006	21,078.2	14,209.9	5,518.1	-32.64%
2007	29,214.2	12,348.1	7,519.3	36.27%
2008	25,406.3	20,318.0	6,243.1	-16.97%
2009	22,526.9	9,665.3	5,520.1	-11.58%
2010	21,858.2	6,690.0	5,318.0	-3.66%
2011	19,272.7	2,850.2	4,648.4	-12.59%
2012	19,141.5	1,978.8	4,593.9	-1.17%
2013	18,233.5	3,027.3	4,336.7	-5.60%
2014	18,082.6	2,263.4	4,237.6	-2.29%
2015	17,984.7	3,417.1	4,229.9	-0.18%
2016	17,339.4	2,329.5	4069.7	-3.79%
2017	16,962.6	2,926.2	4,009.4	-1.47%
2018	16,122.7	2,319.3	3,797.1	-5.30%

Source: Central Bank of Jordan Monthly Billiton, different issues